HP E2457A

Preprocessor Interface for Intel Pentium® Processor and Pentium® Processor with MMX™ Technology

For use with HP logic analyzers

The HP E2457A preprocessor interface for Pentium processors allows you to easily connect an HP logic analyzer to your target system. This preprocessor works with any Pentium processor using a 296-pin SPGA.

The preprocessor has three modes of operation. First, in state-per-transfer mode, the logic analyzer is clocked upon completing data transfer cycles. In this mode, the preprocessor keeps track of the address pipeline and aligns data with its parent address.

The second mode of operation is state-per-clock. Data is captured on every system clock, so you see all processor activity, including wait and idle states. This mode of operation is useful in finding memory locations that do not respond with data and in checking memory control systems.

The third mode of operation is timing analysis. All signals are buffered, but otherwise pass straight through to the logic analyzer.

Software is included with the HP E2457A that automatically configures the logic analyzer, labeling address, data, and status lines. Additionally, an inverse assembler displays execution traces in Pentium processor mnemonics including MMX instructions. The HP E2457A utilizes the power of the HP 16505A prototype analyzer, used in conjunction with the HP 16500B/C logic analysis system.

Selecting Bus cycles

Focus your analysis of the activities on the Pentium processor bus by choosing filter options that allow you to selectively list bus cycles by processor and cycle type. The filter dialog allows the use of color to emphasize cycle type or bus ownership (for dual-

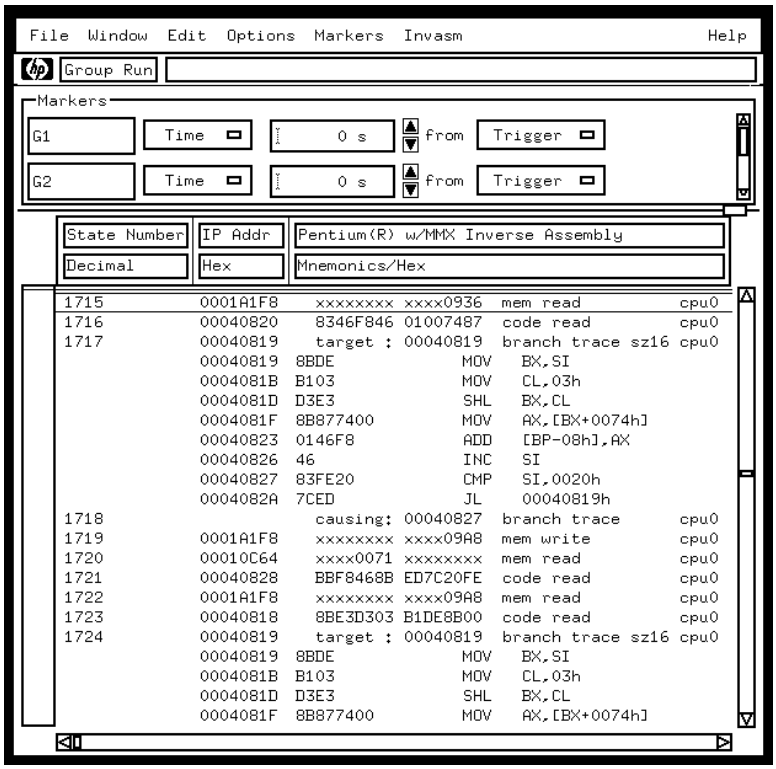

Figure 1. Inverse assembly listing

processor systems). For example, you can display selected bus cycles originating from CPU 0, then highlight I/O reads in red for easy identification.

Viewing Instructions

The HP E2457A includes an inverse assembler that displays code execution in familiar Intel mnemonics. The HP 16505A based inverse assembler takes advantage of the Pentium processor's branch trace message (BTM) bus cycles. Branch trace messages are special bus cycles issued by the CPU (when enabled) that indicate the "from" and "to" addresses of a branch. By using BTMs, the HP E2457A inverse assembler displays a listing of only the instructions executed by the processor(s). For inverse assembly, a run-control probe, such as the HP E3491A, is necessary to enable BTMs and disable caches. The HP E3491A can be easily connected to the E2457A preprocessor via a 20-pin connector when a debug port is not available.

Identifying Processor

The HP E2457A filter options allow you to color instructions by processor. Determining which processor executed a particular code segment in a dual-processor system is simple. As you follow the assembly instruction listing on the display of the HP 16505A prototype analyzer, the color of the trace changes when the other processor takes the execution branch.

C Source Code Tracking

The HP E2457A inverse assembler works in conjunction with the HP B4620A SoftWare Analyzer (SWA) to correlate actual execution flow with your C source code. The accuracy of C source tracing is greatly enhanced since the HP E2457A inverse assembler uses branch trace messages to track the execution of code by each CPU. With instruction cache disabled,

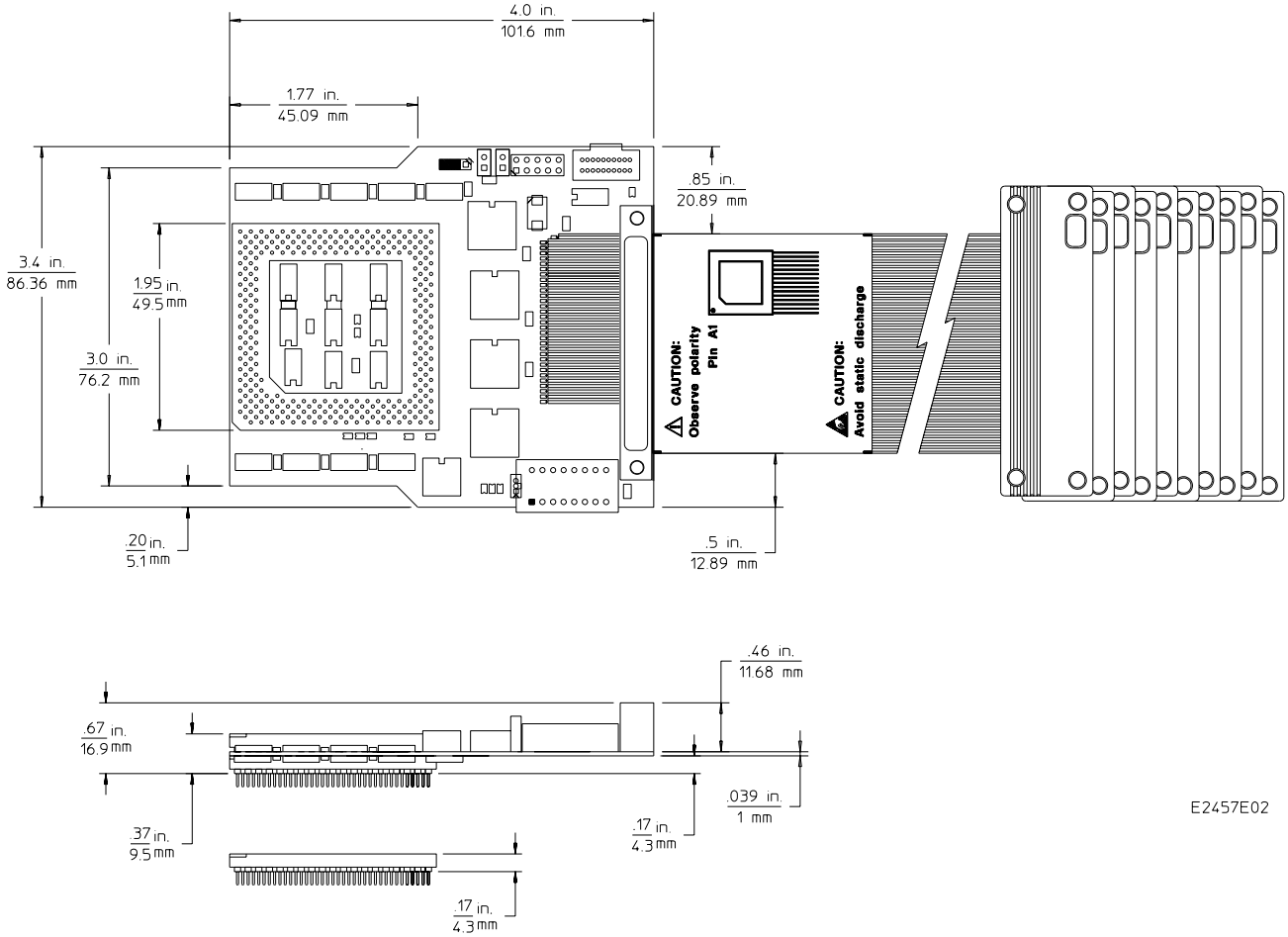

Figure 2. HP E2457A preprocessor mechanical dimensions

Intel assembly instructions can be correlated to the source code from which the instructions were generated.

General Purpose Logic Analysis

A non-BTM-based inverse assembler is supported on the HP 1660C/CS, 1670D and the 16500B/C logic analyzers. This allows inverse assembly without a run-control probe. In this mode, opcode alignment is user-selectable.

Key Specifications

Microprocessor Supported
296-pin SPGA package for the Pentium processor and Pentium processor with MMX technology

Capabilities
Disassembly of floating point and MMX instructions are supported.

Burst mode addresses are calculated and displayed in the state trace listing.

Timing analysis is supported. All signals go through 6.3 ns maximum buffers. (P/N 74FCT646AT).

The preprocessor can be configured to pre-qualify the logic analyzer clock on BRDY#, ADS#, EADS#, BOFF#, and HLDA, saving logic analyzer resources.

Logic Analyzers Supported
Two-card HP 16550A, two- or three-card HP 16554A, 16555A/D or 16556A/D. These analyzers plug into the HP 16500B and 16500C mainframes. In addition, the HP 1660C/CS and 1670D are supported for inverse assembly.

Pods
Eight 16-channel pods are required for inverse assembly. Two additional pods provide monitoring of other status signals.

Termination Adapters
All ten pods are terminated on the preprocessor. No additional termination adapters are required.

Maximum Bus Clock Speed
66 MHz CLK external

Probe loading
- 7 pF in series with 100 Ω on CLK.
- 14 pF in series with 50 Ω on ADS#, BOFF#, BRDY#, BRDYC#, HLDA, KEN#, and W/R#.
- 14 pF on INIT, TDO, SMIACT#, R/S#, RESET, BF0, STPCLK#, and D/P#.
- 10 pF on all other signals.

Power Supply
Power for the HP E2457A is provided by the Logic Analyzer.

Ordering Information

HP E2457A

Preprocessor interface for the Intel Pentium processor
SWA CAPABLE: requires the HP 16500B/C mainframe with any set of the logic analysis cards listed below, the HP 16505A, and the HP E3491A run-control or equivalent
INVERSE ASSEMBLY ONLY:
HP 16500B/C mainframe or 1660C/CS or 1670D portable

Logic Analysis Cards

HP 16554A (2 or 3 cards required)
512 K Sample, 70 MHz state/250 MHz timing logic analyzer module

HP 16555A/D (2 or 3 cards required)
1 M/2 M Sample, 110 MHz state/500 MHz timing logic analyzer module

HP 16556A/D (2 or 3 cards required)
1 M/2 M Sample, 100 MHz state/400 MHz timing logic analyzer module

HP 16550A (2 cards required)
4 K Sample, 100 MHz state/500 MHz timing logic analyzer module

HP 16500B/C (required for full capability)
Logic Analysis System Mainframe

HP 16505A (required for full capability)
Prototype Analysis System

HP 1660C/CS or 1670D
(minimum requirement for limited capability)
Portable Logic Analysis System

HP B4620A (optional)
SoftWare Analysis

HP E3491A (Recommended. A Run Control probe is required for BTM-based inverse assembly.)
Processor Probe

Warranty Information

This Hewlett-Packard product has a warranty against defects in material and workmanship for a period of one year from date of shipment. During this warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective.

Related HP Literature

HP 16500C Logic Analysis System and HP 16505A Prototype Analyzer, 5965-3187E
HP 1660C/CS-Series and HP 1670D-Series Logic Analyzers, 5964-3665E
HP E2467A Intel APIC Bus Preprocessor Interface, 5965-3000E
HP E3491A Pentium Processor Probe, 5963-6855E

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http://www.hp.com/go/tmdir
http://www.hp.com/go/emulator
http://www.hp.com/go/logicanalyzer

You can also contact one of the following centers and ask for a test and measurement sales representative.

United States:
Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
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P.O. Box 999
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